

## **Worksheet to Identify Potential Indicators for Ecological Monitoring**

You return to visit your park in 20 years and walk through the park with the current resource manager. The manager tells you about the current condition of the natural resources, the management issues, and threats of the day. What would that person describe to you?

*Noxious weeds, visibility due to energy development, water quantity due to golf courses, irrigation, development, etc., viewscape, T&E, lack of fire, surplus ungulates, ranchettes, soundscape currently a problem, habitat fragmentation throughout the Missouri Grasslands and park's role in it,*

What are the park's most significant natural resources (e.g., the river and its tributaries, caves and cave fauna, rare plant communities, elk herd)?

*Prairie/badlands ecosystem, Little Missouri River, wildlife in general, i.e., THRO is a wildlife park, especially bison and pronghorns and all, behavior of wildlife, archeological and potential paleontological, springs and seeps, cottonwood corridor, woody draws, diversity of passerine birds*

What does your park contribute to regional biological diversity (e.g., what natural resources are preserved and protected at your park that are altered or threatened throughout the rest of the region)?

*Natural system without cattle grazing, i.e., the woody draws, different number of plant communities, high diversity in both composition and structure, significant and large prairie dog complexes, burning coal veins*

What park-specific legislative mandates direct the park to monitor a particular natural resource at your park.

*Class I airshed*

What federal and state-listed threatened and endangered species are known to occur in the park?

*Prairie dog is a federal candidate, transient bald eagles, ? chub was a federal candidate, (look into NRMAP),*

What is that status of your park's management plans?

*Very old GMP, start a new one in the near future, RMP from 94, Fire Plan from 98 and 99, EPMT compliance plan, no veg, no wilderness*

What is currently being monitored at or near the park by NPS or other entities (e.g., plants by fire effects program, plants by LTEM, exotic plants by exotic plant teams, birds by Breeding Bird Survey, butterflies, stream by USGS, Christmas bird count, weather data, NRCS photography, visitors by park staff, state roadside counts --- use the checklist below)?

*Air: PRIMENET station, state Dept. Health particulate and ozone at same station, dioxins, since 98: state run station in the North Unit*

*Amphibian: ARMI out for 2 years, ARMI station, (check on status on of report)(a candidate for research because of PRIMENET station)*

*Birds: Christmas count, tracking of golden eagle nest*

*Fire: Fire Effects, mapping fires,*

*Fish: FWS has done some inventory type work – look into it; EPA sampling done in 1998 related to PRIMENET, analyzed the fish for contaminants (through Las Vegas Nevada office)*

*Geology: No*

*Mammals: Prairie dogs walking edge of town with GPS every couple years, informal and irregular monitoring of population size of large mammals, park is a block for state mule deer reproduction fall surveys every year, do sheep in the North Unit, ground survey of horses,*

*Meteorology: At air quality site, NOAA will put one in a Painted Canyon, longterm NOAA station in town, have a station in the North Unit, nothing in Elkhorn unit, may need more sophisticated equipment in the North Unit*

*Pests: State supplies gypsy moth traps that park puts out, now monitoring mosquitos for West Nile, have in the past monitored fleas on prairie dogs for plague, was intended to be long-term*

*Pesticides In early 90s monitored for Tordon, a “haphazard” process, (Andrascik may have details)*

*Reptiles: No (small population of horned lizards in park)*

*Soils: Some small scale research plots*

Sound: *Did have a device at the Elkhorn around 96 for purpose of bridge prevention. Contact ARD.*

Vegetation: *A few sites have been put in. Whitacker plots. Some transects from Irby work was multi-year but discontinued about 5 years ago. Some exclosures but questions about their status, Chad has some exclosures*

Visitors . Count visitors to park. Not good trail use monitoring.

Visual Landscape: *Have established photo points in both units. Maybe goes back 4-5 years. Steve has image Access database. (Hager has the details)*

Water Quality and Quantity: *USGS gauge in Medora and Watford City (latter may be discontinued). FWS may be conducting some.*

Wildlife or Plant Disease: *brucellosis, TB, johnies, anaplasmosis through roundups, CWD through hunter harvest, West Nile and plague (see above),*

What are the stressors on park resources? What are the sources of each stressor?

What potential management actions in the future may require monitoring (e.g., potential species reintroductions, land acquisitions, commercial uses)?

*Land acquisition at Elkhorn Ranch expansion*

What would your partners like you to monitor?

*EPMT EA raised issued of water quality monitoring.  
Stakeholders would like to monitor water quality due to golf course  
State NDGF would like monitoring of elk and sheep*

Vital signs are: 1) sensitive enough to provide early warning of change, 2) have low natural variability, 3) can be accurately and precisely measured, 4) have costs and effort of measurement that are not prohibitive, 5) have monitoring results that can be interpreted and explained, 6) are low impact to measure, and 7) have measurable results that can be replicated with various personnel. Off the top of your head, look into your crystal ball and choose several vital signs to monitor over time to track the condition of natural resources within your park (items can range from broad, e.g., the stream, to narrow, e.g., a particular species). What are those vital signs? Rank them in order of importance.

*Vegetation community*

*Plant community in noxious weed treatment area*

*Water quality and quantity on the river*

*Amphibians presence/absence and deformity surveys*

*Utilization monitoring*

*Water quality and quantity on springs and seeps*

*Fluvial geomorphology*

*Effects of pesticides on mammal (e.g., prairie dogs) and amphibians health, e.g., tissue*

*Effects of pesticides on non-target plants, soils*

*Effects of hikers/horseback riding on spread of noxious weeds and other impacts*

*Combustion of coal veins in the park on air quality and physiography and vegetation*